

B.Tech. Fourth Semester (Polymer (Plastic) Technology) (CGS)

11104 : Chemical Engineering Operation-I (Mechanical Operation) : 4 PP 01

P. Pages: 2 Time: Three Hours		* 0 6 6 5 *	AW - 3069 Max. Marks : 80	
Notes :	1.	All question carry marks as indicated.		
	2.	Answer three question from Section A and three question from Section	on B.	
	3.	Due credit will be given to neatness and adequate dimensions.		
	4.	Assume suitable data wherever necessary.		
	5.	Diagrams and chemical equations should be given wherever necessary	·. `	
	6.	Illustrate your answer necessary with the help of neat sketches.		
	7.	Use of pen Blue/Black ink/refill only for writing the answer book.		

SECTION - A

1.	a)	Explain the principle and working of a gyratory crusher with neat sketch.	8

b) Explain why Bond's law is more realistic than kick's law and Rittinger's law. 6

OR

- a) Define work index and show that how it is related to the Bond's constant. What is the power 10 required to crush 100 Tons per hour of limestone, if 80% of the feed passes a two inch screen and 80% of the product to 1/8 inch screen? Take 12.74 as work index for limestone.
 - b) Give one example of each equipment which work on following principles: i) Compression
 ii) Impact
 iii) Attrition
 iv) Cutting
- 3. a) Explain the batch test for sedimentation.
 - b) Explain the principle of process of tabling in detail.

OR

- 4. a) What will be the settling velocity of a spherical ball of 0.4mm in diameter in an oil of 7 specific gravity 0.82 and viscosity 10^{-3} N s/m²? The specific gravity of steel is 8.00.
 - b) What are the various types of thickener? Discuss the various zones in continuous thickener. 6
- 5. a) Distinguish between mixing and agitation with example.
 - b) Discuss the construction and working of Banbury mixer.

OR

- 6. Describe the construction and working of belt conveyor with the help of following points:- 13
 - i) Belt material and construction.
 - ii) Belt Drive Arrangement.
 - iii) Material feeding and discharge arrangements.

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7.	a)	What is the principle of filtration? Derive the equation for constant rate and constant pressure filtration.	7
	b)	Explain in detail construction and working of rotary drum filter. State its advantages and disadvantages.	7
		OR	
8.	a)	Compare in detail the pressure filter with vacuum filter.	7
	b)	Explain the construction and working of plate and frame filter press in detail with the help of neat diagram.	7
9.	a)	Discuss the construction, working and calculation of magnitude, pressure and stress developed in centrifuge.	8
	b)	Explain the construction and working of cyclone separator.	5
		OR	
10.	a)	Explain the principle of scrubber.	5
	b)	A centrifuge with a phosphor-bronze basket 375mm diameter is to be run at 30Hz with a 100mm layer of solids of bulk density 2000 kg/m^3 at the walls. What should be the thickness of the walls of the basket if the perforations are so small that they have a negligible effect on strength. Density of phosphor bronze = 8900 kg/m^3 Maximum safe stress for phosphor-bronze = 55 MN/m^2 .	8
11.	a)	Derive the Langmuir and Freundlich equation for adsorption isotherm.	6
	b)	Discuss the characteristics of good adsorbents and their application on commercial level.	7
		OR	
12.	a)	Explain the BET isotherm.	6
	b)	Discuss the break through curve in adsorption	7

Discuss the break through curve in adsorption. b)
